DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND
FORT HUACHUCA, ARIZONA

VALIDATION TEST PLAN FOR COMMON IMAGERY INTEROPERABILITY WORKING GROUP'S IMAGE ACCESS SERVICE SPECIFICATION VERSION 1.1

MARCH 1997

VALIDATION TEST PLAN
FOR
COMMON IMAGE
INTEROPERABILITY WORKING
GROUP'S
IMAGE ACCESS SERVICE
SPECIFICATION
VERSION 1.1

MARCH 1997

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EXECUTIVE SUMMARY

The National Imagery and Mapping Agency (NIMA) (formerly the Central Imagery Office (CIO) and Defense Mapping Agency (DMA)) requested the Joint Interoperability Test Command (JITC) conduct validation testing of the proposed Image Access Service (IAS) specification, version 1.1. The IAS was developed by the Common Imagery Interoperability Working Group (CIIWG) in an effort to standardize the software interfaces required to access imagery and imagery based products.

The IAS provides a standardized interface for the discovery, retrieval or creation of imagery and imagery based products. The providers of the products could range in size from national imagery archives down to local libraries. The users of the products could range from other archives to imagery exploitation systems to simple viewers of imagery.

Validation testing determines the extent to which the IAS specification is technically correct, free of conflicts, complete, unambiguous, implementable and testable.

The JITC National Imagery Transmission Format Standard (NITFS) Certification Test and Evaluation (CTE) Facility will conduct the validation test in April 1997. The dynamic review will be conducted in an unclassified environment 7-18 April 1997 at the CACI Inc. facility in Fairfax Virginia. The classified review will be conducted 21 April to 2 May at the IDEX facility in Sunnyvale, California. The results of the validation test effort will be used by the CIIWG as substantive input to the overall validation process for the formal release of the specification.

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SECTION I: INTRODUCTION

I-1 BACKGROUND

I-1.1 General. The National Imagery and Mapping Agency (NIMA) (formerly the Central Imagery Office (CIO) and Defense Mapping Agency (DMA)) requested the Joint Interoperability Test Command (JITC) develop a validation test plan for the Common Imagery Interoperability Working Group's (CIIWG) Image Access Service (IAS) specification when specialized with the Common Imagery Interoperability Profile (CIIP).

I-1.2 Image Access Service. The IAS specification addresses the core interoperability requirements for the United States Imagery and Geospatial System (USIGS) for client access to imagery and imagery-based products. The specification defines the interface requirements for the following facilities from the Common Imagery Interoperability Facilities (CIIF) reference model: Image Access Facility (IAF), Catalog Access Facility (CAF), and Profile and Notification Facility (P&NF). The supported operations include image product discovery, metadata attribute retrieval, whole product retrieval, image region retrieval, and client product creation.

I-1.3 Common Imagery Interoperability Profile. The CIIP for Image Access defines the content of the information passed through software interfaces to be used to achieve interoperability between multiple clients and servers within the USIGS architecture. For the validation testing a subset of the CIIP, the IAS Specification Validation Test Profile (IVTP), is used.

I-1.4 Interface Definition Language. The IAS facilities are specified using the Interface Definition Language (IDL). IDL is a language independent notation for specifying software interfaces. IDL can be readily compiled into software interfaces for various languages including C, C++, Ada95, and Smalltalk.

I-1.5 Validation Methodology. The validation methodology is based on a five step validation process as outlined in JIEO Circular 9008. Upon successful completion of these steps, the proposed standards are considered to be validated. A natural outcome of this process is the creation of the Means of Testing (MOT) to be used for follow on testing of products for conformance to the validated standard.

a. Step 1. First the service, functional, and performance requirements are fully identified and the appropriate authority ratifies that the requirements are valid. Next, the test objectives and criteria are developed that will be used to ascertain whether the proposed solution satisfies the validated

requirements. The Imagery Standards Management Committee (ISMC), as the appropriate authority, ratifies the requirements and establishes the validation objectives and criteria.

b. Step 2. As the proposed standard is written, conformance test objectives, criteria, and test cases are also written.

c. Step 3. A physical realization of the standard is implemented and a sample implementation is developed. The tester will develop test procedures and tools needed to conduct conformance testing independent of the developer, but in coordination with the sample implementation.

d. Step 4. The conformance test procedures and tools will verify that the sample implementation conforms to the proposed standard. Based on conformance test results, the sample implementation may be modified and retested until it adequately conforms with the proposed standard.

e. Step 5. Once the sample implementation is verified as conforming to the proposed standard, the implementation is evaluated against the objectives and criteria defined in the first step to determine how well the proposed standard meets the original service, functional, and performance requirements.

I-2 PURPOSE. This validation plan outlines the process, methodology and test related actions that will be taken to help validate the proposed IAS interface facilities are technically correct, consistent, complete, and testable.

I-3 SCOPE

I-3.1 Overview. Figure 1 portrays the general approach the JITC will use to validate the proposed IAS specification. The subsections are summarized as follows.

a. Documentation Static Review

(1) Analyze Standards. The first validation process will review and analyze the IAS specification and the CIIP to identify any internal conflicts, oversights, or ambiguities which are considered faults and must be resolved before the proposed specification can be verified.

(2) Identify Specified and Implementation Requirements. A complete set of requirements will be extracted from the proposed standard and broken down into those which state policy and those involving implementation issues. Both types of requirements are important for the overall analysis of the

standard; those involving implementation issues are of particular use in nominating the test criteria and strategies.

(3) Nominate Test Criteria and Strategies. Test strategies and criteria will be identified and nominated by which the interfaces can be tested for conformance to each implementation requirement.

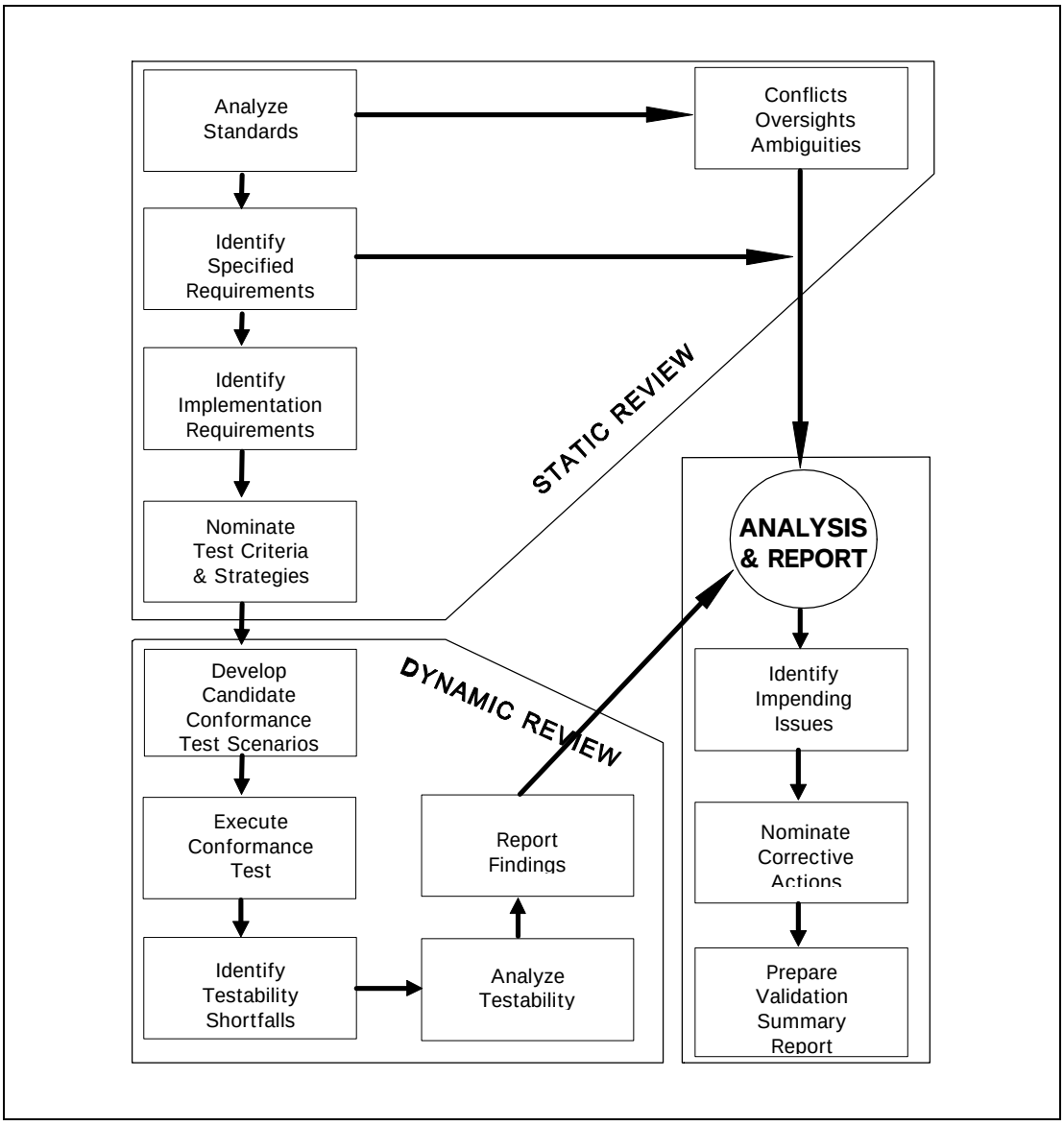

Figure 1. General Validation Approach

b. Implementation Dynamic Review. The second validation process involves developing candidate test scenarios and executing the test strategy on the sample implementations of the proposed standard. In DOD procurements, conformance to mandated requirements must be tested, particularly

those with operational consequences. There are several steps to the determination of testability as outlined in the following subsections.

(1) Develop Candidate Conformance Test Scenarios. Based on the identified implementation requirements, candidate conformance test scenarios will be developed for evaluation of the sample implementations.

(2) Execute Conformance Test. Based on the interfaces and methods supported by the developer, the candidate test scenarios will be executed and results will be collected.

(3) Identify Testability Shortfalls. All shortfalls on the overall testability of the proposed standard will be identified.

(4) Analyze Testability. The conformance test results and testability shortfalls will be reviewed for overall impact on testability of the proposed standard. During analysis, all facets of the effort (proposed text, sample implementation, and candidate test scenarios) are suspect.

(5) Report Findings. All problems and shortfalls identified in the dynamic review process will be reported in the overall analysis of the static and dynamic results of the process.

c. Analysis & Report

(1) Identify Impeding Issues. The static and dynamic reviews result in a set of issues which will be documented and analyzed for corrective action.

(2) Corrective Actions. Corrective actions for each identified issue will be nominated to the standard-submitting agency. Recommendations will be made to either change the proposed text of the standard, change the sample implementation, or change the candidate test scenarios. The objective is to get the proposed standard, sample implementation, and the candidate test scenarios in harmony. Resolutions to the issues will be again passed through the static and dynamic review cycles.

(3) Validation Report. All of the analyses and associated efforts will be documented in a validation report.

I-3.2 Resources. The NITFS Certification Test and Evaluation (CTE) Facility will provide all support for the validation testing of the IAS specification. The CTE Facility has conducted numerous tests for military imagery standards over the past five years and is uniquely qualified to perform this assessment.

a. Table 1 shows the systems to be tested and their points of contact.

Table 1. Systems to be Tested

IDEX	POC:	John Files
	Phone:	408-756-9651
	Fax:	408-742-7105
	Email:	john.files@lmco.com
	Address:	Building 195D Organization 3D10 11 Lockheed Way Sunnyvale, CA 94089
IE2000	POC:	Andy Hall
	Phone:	315-330-7038
	Fax:	315-330-2022
	Email:	halla@rl.af.mil
	Address:	ATTN: IRRE 32 Hanger Road Rome, NY 13441-4114
LMC	POC:	Lisa Burns
	Phone:	301-240-4814
	Fax:	301-240-7190
	Email:	lisa.burns@lmco.com
	Address:	Lockheed Martin Federal Systems 700 North Frederick Ave. Gaithersburg, MD 20879
UCSB-ADL	POC:	Qi Zheng
	Phone:	805-893-7684
	Fax:	805-893-3045
	Email:	zheng@alexandria.sdc.ucsb.edu
	Address:	Alexandria Digital Library UCSB Santa Barbara, CA 93106
CACI	POC:	Lee Patton
	Phone:	703-277-6763
	Fax:	703-277-1025
	Email:	lpatton@std.caci.com
	Address:	CACI Inc. - Federal 3930 Pender Drive Fairfax, VA 22030

I-3.3 Test Schedule. The static portion of the validation began on the inception of the CIIWG and is currently ongoing with the development of the specification. The dynamic review will be conducted in two phases. Phase One will be in an unclassified environment at the CACI Inc. facility in Fairfax, Virginia on 7-18 April 1997 and at the University of California, Santa Barbara, CA during 21 April to 2 May 1997. Phase Two will be in a classified environment at the IDEX facility in Sunnyvale, California on 21 April to 2 May 1997. The validation test report will be published 1 June 1997.

I-3.4 Limitations. Standards cannot be guaranteed to be free of conflicts, unambiguous, and complete. The static review by itself provides a limited level of confidence that the specification meets these requirements. The implementation review provides an analysis of a sample implementation built in accordance with the text of the proposed standard, determines the extent to which the proposed specification is implementable, determines the extent to which the proposed specification is testable through test scenario development, and confirms, identifies shortfalls, and/or refutes findings from the static review of the proposed specification documentation. The combined documentation static review and implementation dynamic review provide a more thorough analysis of the proposed specification and a higher level of confidence in the validation of the specification than if only the traditional text review were conducted.

I-4 IMAGE ACCESS SERVICE FACILITIES TO BE TESTED

I-4.1 Image Access Facility. The Image Access Facility (IAF) defines the interfaces for retrieval of image products. The range of supported products includes full frame images, image chips, sub-images, display regions, and imagery-based reports. The facility supports the creation (uploading) of new products by the client.

I-4.2 Catalog Access Facility. The Catalog Access Facility (CAF) defines interfaces for query-based discovery of image products and retrieval of metadata attributes. Supported queries include attribute-based Boolean queries and geographic queries.

I-4.3 Profile and Notification Facility. The Profile and Notification Facility (P&NF) enables clients to create and manage interest profiles that serve as standing catalog search specifications and automatic retrieval of image products. The standing requests allow users to register their notification and retrieval preferences, so that the facility implementation can detect when new catalog entries satisfy their profile. This facility will not be evaluated in the scope of this testing.

I-4.4 Access Management Interface. This interface addresses requirements for client interactions with the operational and management aspects of geospatial information archives. It is not intended to replace full archive management or system administration interfaces. It is intended only to provide the functions that a client uses to make its requirements clear to the archive. These operations include checking availability of information for a particular purpose and submitting requests to make information available for a specific, possibly specialized, purpose. This interface will not be evaluated in the scope of this testing.

I-4.5 Test Approach. Since this is the very first instance of implementations, there are no conforming products. First a client and server pair are validated. These two are considered nominal baselines for conformance testing of the other implementation, but with the understanding that deficiencies may surface. Any deficiencies identified could be the result of shortfalls in the specification, implementation, and/or means of test. Once all the clients and servers achieve a known level of conformance, interoperability can be evaluated. Figure 2 illustrates this conceptual approach for validation testing.

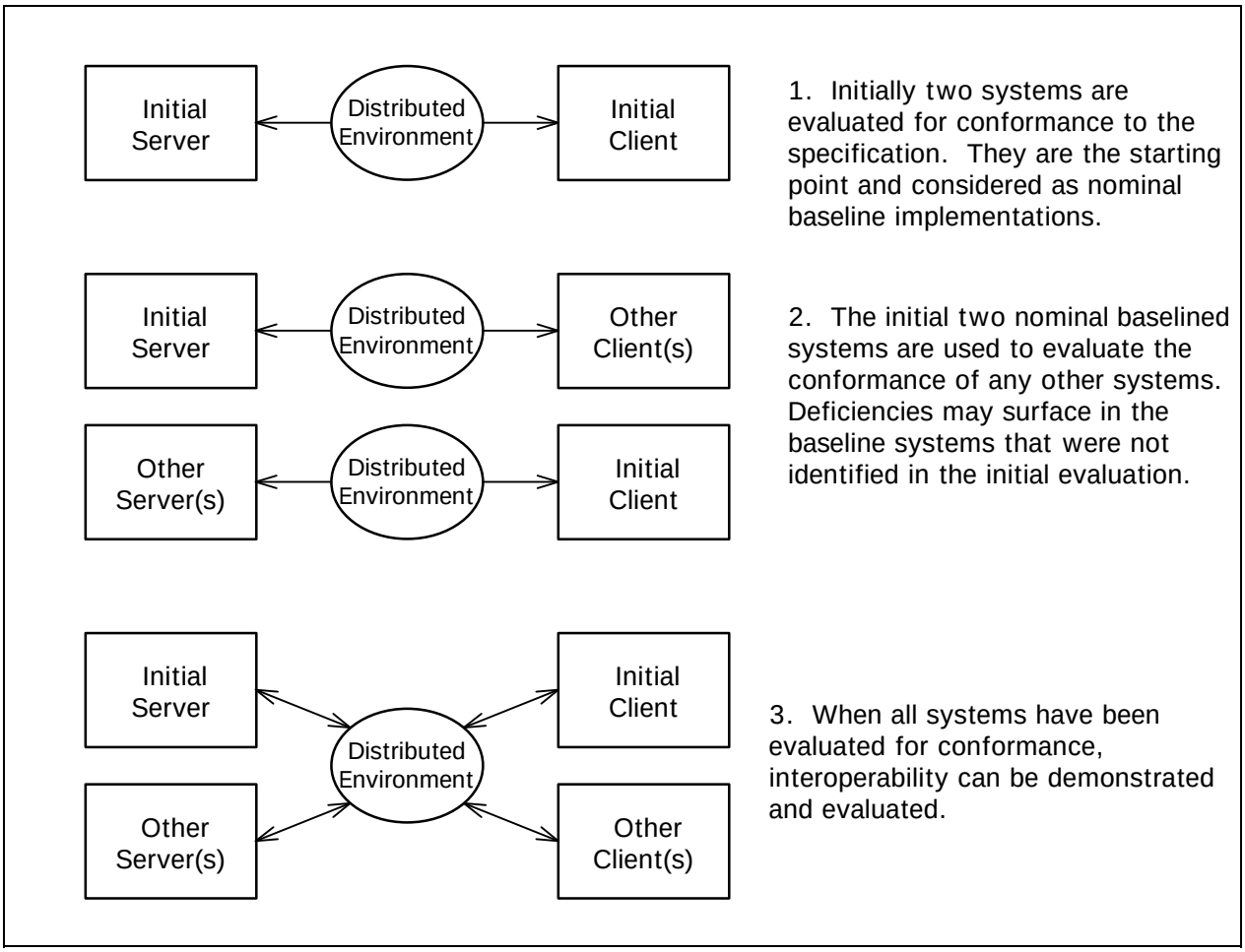

Figure 2. Test Approach

Client and server interfaces will be evaluated through the scenarios described in Appendix E of this test plan. These scenarios have been developed to address all conformance criteria. In a typical execution, the server is loaded with control data and the client executes the scenario steps. At the appropriate times during the scenario, response data are captured and recorded. Response data is compared with the control data to determine the results of the scenario. Figure 3 illustrates this process.

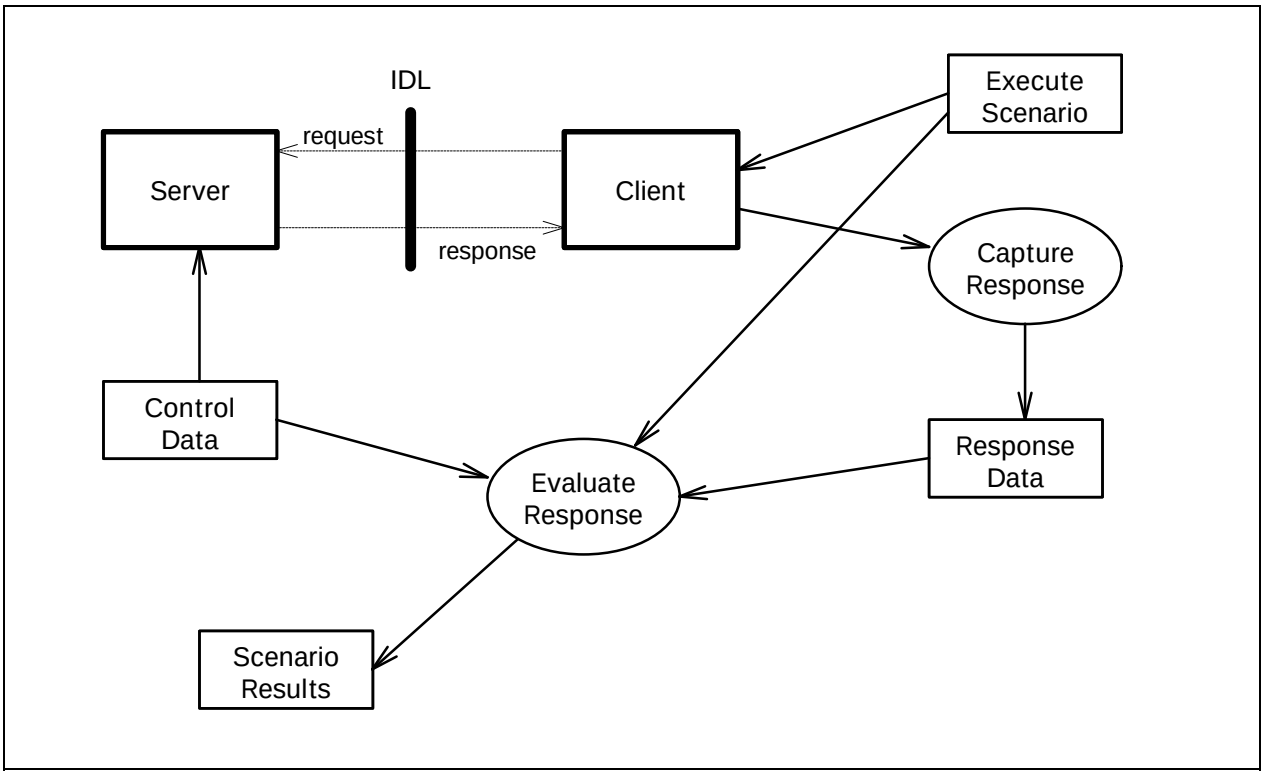

Figure 2. Test Process

I-4.6 System Capabilities. Tables 2, 3, 4 show the implemented capabilities by the systems to be tested.

Table 2. System Capabilities Summary, Image Access Facility

Interface	Methods	IDEX	IE2000	LMFS	UCSB-ADL	CACI
Server	open	CS		C		CS
	close	CS		C		CS
Parameters	get_parameters	CS		C		CS
	set_parameters	CS		C		CS
Image Access	disseminate	CS		C		CS
	check_completion	CS		C		CS
	cancel	CS		C		CS
	create	CS		C		CS
	open_array	CS		C		CS

	close_array	CS		C		CS
	get_region	CS		C		CS
	get_multiple_regions	CS		C		CS
	get_subimage	CS				CS

S = Server implementation, C = Client implementation.

Table 3. System Capabilities Summary, Catalog Access Facility

Interface	Methods	IDEX	IE2000	LMFS	UCSB-ADL	CACI
Server	open	CS	CS	C	CS	CS
	close	CS	CS	C	CS	CS
Parameters	get_parameters	CS	CS	C	CS	CS
	set_parameters	CS	CS	C		CS
Catalog Access	boolean_query	CS	CS	C	CS	CS
	polygonal_query	CS		C	CS	CS
	elliptical_query					CS
	point_query	CS		C		CS
	get_ results	CS	CS	C	CS	CS
	free_results	CS	CS	C	CS	SC

S = Server implementation, C = Client implementation.

Table 4. System Capabilities Summary, Profile and Notification Facility

Interface	Methods	IDEX	IE2000	LMFS	UCSB-ADL	CACI
Server	open					
	close					
Parameters	get_parameters					
	set_parameters					
Profile and	boolean_query					
Notification	polygonal_query					

	elliptical_query					
	point_query					
	get_ results					
	free_results					
	list_queries					
	remove_query					
	request_notification					
PNF_Callback	notify					

S = Server implementation, C = Client implementation.

Table 5. System Capabilities Summary, Access Management Interface

Interface	Methods	IDEX	IE2000	LMFS	UCSB-ADL	CACI
Access Management	use_modes					
	check_availability					
	request_availability					

S = Server implementation, C = Client implementation.

I-4.7 Test Connectivity. The connectivity configuration for the unclassified and classified testing is shown in Figure 4 and Figure 5.

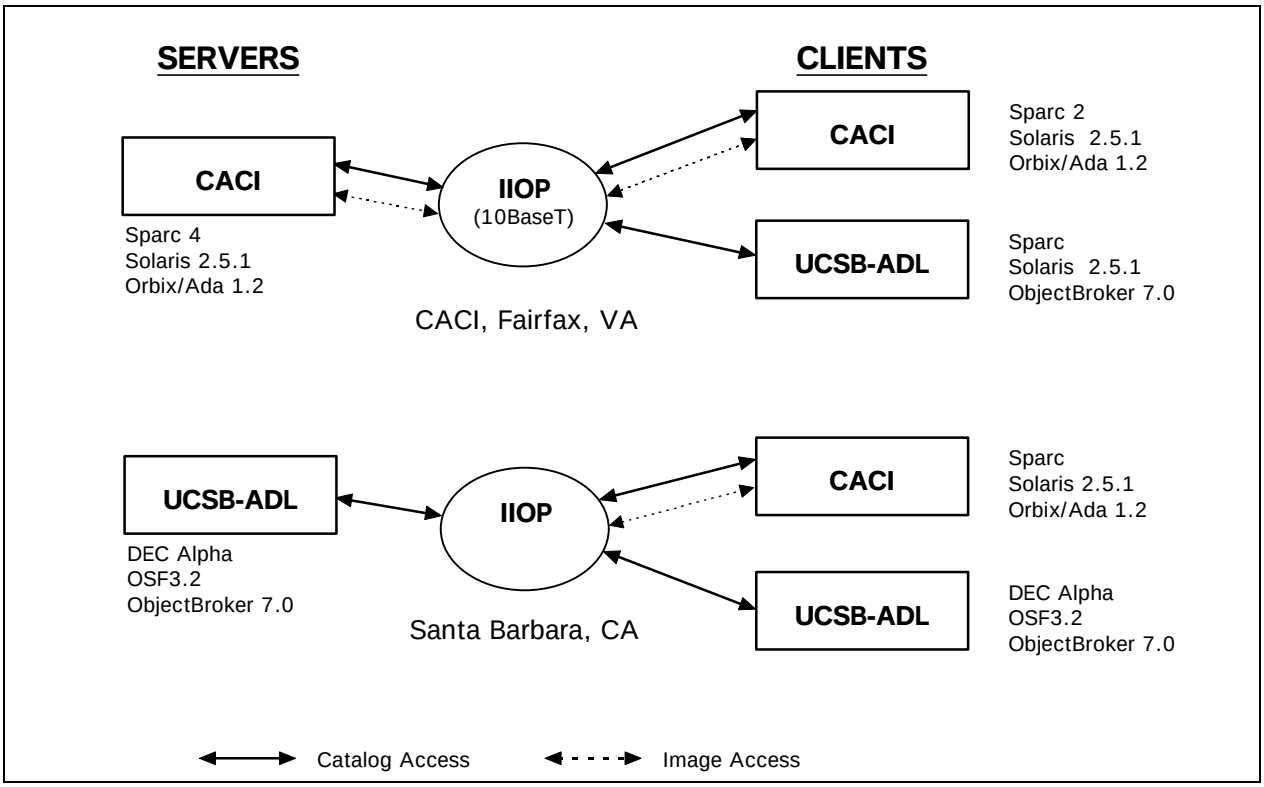

Figure 4. Unclassified Test Connectivity

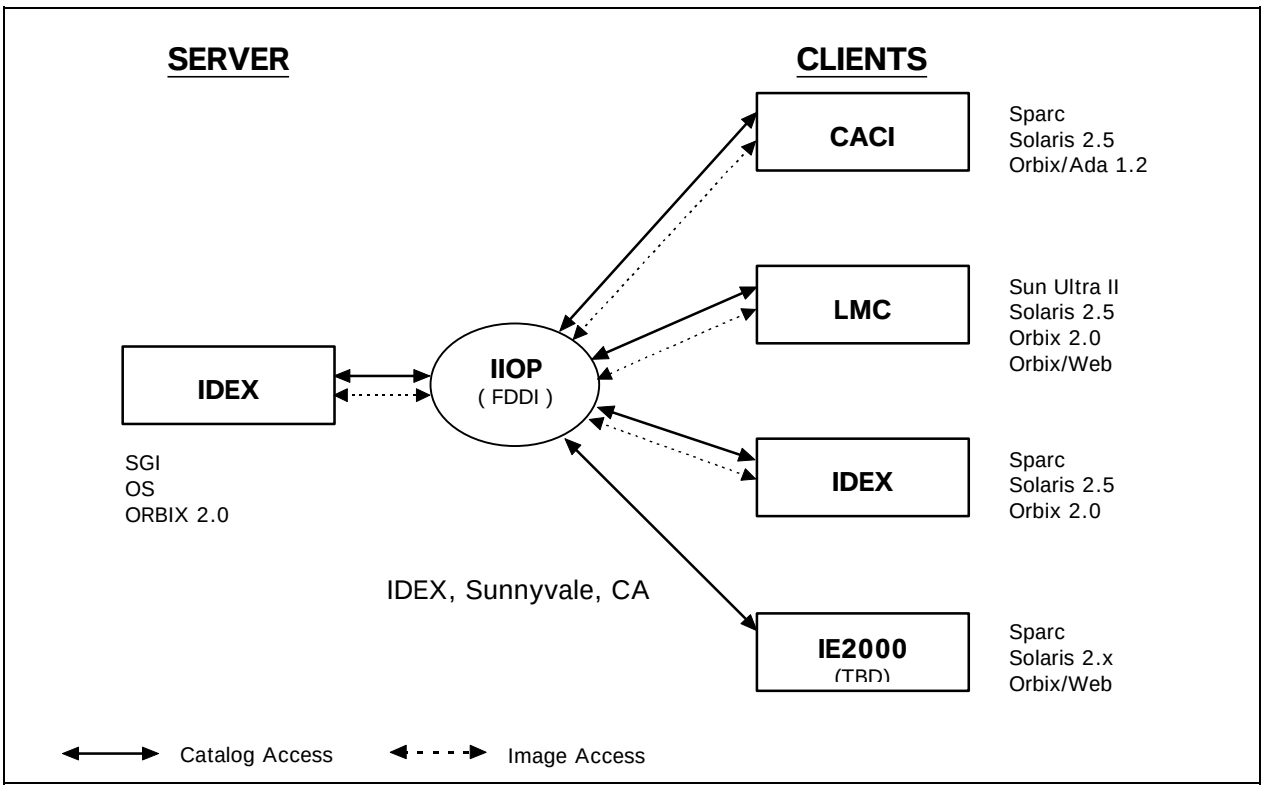

Figure 5. Classified Test Connectivity

SECTION II: DETAILS OF TEST

II-0 GENERAL. The overall test objective is to ensure the Image Access Service is technically correct, consistent, complete, implementable, and testable.

II-1 SUBTEST I, DOCUMENTATION STATIC REVIEW

II-1.1 Objective. To determine to what extent the proposed Image Access Service is technically correct, consistent, and complete.

II-1.2 Criteria. In the context of standards validation, the term "validation" means to determine whether a standard is capable of supporting its intended use and is adequately documented to support implementation by disparate developers. The intended use of the proposed IAS is for access and retrieval of imagery and imagery-related products. From this intended use, a number of key criteria can be derived which the standard must be able to support.

a. Free of Conflicts. The proposed IAS standard and other applicable standards must be mutually free of conflicts (e.g. technical or logical conflicts of requirements, that if implemented, cause the implementation to violate conformance to other related standards or clauses of the same standard) or contains a clear set of precedence statements by which any conflicts can be resolved.

b. Completeness. The standard must specify, or support specification of, all parameters within the scope of the standard that are necessary to support the development of a new implementation. In addition to static review, the reference implementation (implementation dynamic review) is evaluated to see if the text addresses all features demonstrated.

c. Ambiguity. The standard must specify required capabilities in an unambiguous way so that there is no basis for confusion as to what is required.

d. Conformance Testability. It must be feasible to test that products/ implementations conform to the standard.

II-1.3 Test Procedures

a. Test Conduct

(1) Analyze the Standard. JITC NITFS CTE Facility personnel will analyze the proposed text of the IAS and its associated standards in accordance with the general validation approach previously discussed in Section I.

Each sentence, clause, and equation will be evaluated for accuracy of content and absence of conflict with the portions of the standard through an exhaustive comparison of text throughout all affected standards. Additionally, the proposed standard will be distributed to CIIWG members and all interested entities for review. All comments resulting from the documentation static review cycle will be accumulated for analysis. Observations from the conduct of the implementation dynamic review (e.g. Does the implementation match the text and the desired function of nomination?) having impact on the proposed text will also be evaluated. This will be the primary source for assessing accuracy of content, completeness, lack of ambiguity, and testability of the proposed text.

(2) Flag Issues. Any issues uncovered will be provided to the Center for Standards (CFS) and the proponent prior to detailed analysis, to determine if they are substantive. This may result in the elimination of some issues.

b. Data Collection. Collected data will include any anomalies or issues regarding the proposed specification identified during the Documentation Static Review along with associated comments and recommended resolutions.

II-1.4 Results. The results of the static review will be documented as individual issues.

a. Criteria Related. Figure 6 provides an example of how Subtest I results will be recorded. Major anticipated categories of issues include:

(1) Conflicts/Inaccuracies.

(2) Missing Information.

(3) Clarifications.

(4) Testability.

(5) Administrative Issues. Errors in grammar, spelling, punctuation, etc.

b. Other. None.

IAS VALIDATION ISSUE

1. **ISSUE TITLE**: Administrative Issue
2. **ISSUE NUMBER**: 1
3. **VERSION NUMBER**: 1
4. **DATE**: 25 January 1997
5. **ACTION ORGANIZATION**: NIMA
6. **POINTS OF CONTACT**: Name of Individual Making Comment, Organization Office Symbol, phone number.
7. **STATUS**: OPEN
8. **DISCUSSION**: The following items are errors in grammar, typos, or titles:

a. Para 3.1.a. NITFS is National Imagery Transmission Format Standard vice "Standards".
Rationale: National Imagery Transmission Format Standard is the proper name.

b. Para 3.1.b. Data Elements. Figure 7 should be referenced here.
Rationale: This paragraph is where the standard begins discussion on the items contained in figure 7.

9. **CONCLUSION**: The above items have simple solutions and can be easily resolved.
10. **RECOMMENDATION**: Recommended changes are contained in the discussion.
11. **RESOLUTION**: Forthcoming.

Figure 6. Example of Subtest 1 Results

II-1.5 Analysis and Discussion. Each issue resulting from the document review will be described to include an impact statement and suggested resolution in the narrative report. This may be an iterative process in conjunction with CIIWG member review.

a. Analyze Issues. Each issue identified will be analyzed to determine its validity and identify a possible solution. There are three possible outcomes of this analysis:

(1) Issue Cleared**.** The issue may not have been valid, in which case the issue will be flagged as a cleared issue.

(2) Solution Available**.** A solution may be apparent or the results of further analysis and testing may have developed a solution. In either case, recommended solutions to issues will be provided as they are uncovered.

(3) Validation Problem**.** An issue may be determined to be a problem sufficiently disruptive as to require major re-work of the standard. In such

an event, the problem will be flagged to the CIIWG along with a recommendation against validation of the standard in its current form.

b. Evaluate Test Results. Test results will be evaluated to determine whether all aspects of the issue have been covered. The results of the testing will be fed back into the overall issue analysis process. It can be anticipated that the issue will be resolved as: (1) issue cleared; (2) validated problem; or (3) a solution is available and a recommendation is made.

c. Summary Report. The Summary Report will describe the degree to which the standard can be considered validated, any areas that are validation shortfalls, and recommendations for corrective action. Exceptions to the validation are expected to be categorized as follows:

(1) Issues with Recommendations. Issues with recommendations that would clear the issues once accepted by the standards working group committee.

(2) Issues that are Unresolvable. These are issues for which there appears to be no resolution other than major change to one or more standards.

(3) Pending Test Issues. Some issues may require further testing to determine whether they can be resolved. For example, a feature specified in the standard may not have been implemented in the sample implementation that was made available to the test team. Testing may extend beyond the currently identified date for reporting on validation. These issues will be stated along with their consequences and recommendations on how to proceed pending completion of testing.

II-2 SUBTEST II, IMPLEMENTATION DYNAMIC REVIEW

II-2.1 Objective. The objectives of the dynamic review are:

a. To develop and verify the nominated means of test using a sample implementation of the proposed specification.

b. To evaluate the degree of compliance of the sample implementation to the proposed specification.

c. To enhance the static documentation review of Subtest I through the technical experience gained through the process of attempting to implement the specification and measure its compliance.

II-2.2 Criteria

a. Test cases can be constructed which fully measure the nominated compliance criteria for the specification.

b. The sample implementation has implemented all features defined in the specification.

c. The sample implementation does not contain needed features that are not fully defined in the specification.

d. For each functional requirement in the specification, there is full agreement with the text of the specification, the realization of the functional requirement in the sample implementation, and the means of test.

e. A suitable means of measure can be identified and accomplished for each requirement of the specification.

f. There is a definitive way to present test results, analyze the results, and present conclusions and recommendations.

II-2.3 Test Procedures

a. Test Conduct. The test team will develop candidate subtests needed to evaluate the nominated compliance criteria. The candidate subtests are described in Appendix C. A summary of candidate test scenarios is shown in a tabular form in Appendix D. The table indicates which subtest criteria are exercised by each candidate test scenario. Appendix E contains the candidate test scenarios and associated procedures. Appendix F contains summary details of the image files and image metadata used in the test scenarios from Appendix E. The

test team will execute the candidate subtests according to the nominated means of test.

b. Data Collection. Data collection requirements are as follows:

(1) Annotated data collection forms with any scenario related anomalies noted.

(2) Hard copies of the comparison between the scenario results and the control data.

II-2.4 Results

a. Criterion Related. The resulting test data will be correlated to the above criteria by means of a pass/fail/not implemented matrix. Identified problems will be described in a Test Incident Report (TIR) with attached hard copy of the image(s) or test tool printout(s). Figure 7 is an example of a test incident report. Any failures will be explained in sufficient detail to ensure a full understanding of specific problems related to this subtest.

b. Other. None.

TIR NUMBER: XYZ-10 **DATE:** March 15, 1995

TEST INCIDENT REPORT

XYZ TEST

TEST CASE(S): U221C0N0 **CRITERIA: JC 9008, para 5-6**

RELATED TIRs: N/A

DESCRIPTION:

The XYZ Image Manager when ported onto a DX4/486 100 MHz workstation displayed an Image Manager error and General Protection Error while unpacking the above test case (U221C0N0). This test case exercises the unpacking of an 8 bit color image with a look-up table (LUT) of 128 bytes.

IMPACT:

All NITFS compliant systems must demonstrate their ability to unpack and display color imagery with LUTs, per JIEO Circular 9008, dtd 30 June 93. Systems not capable of displaying imagery with LUTs could be detrimental to mission obligations.

RECOMMENDATION:

The XYZ package is a sample demonstration package provided by NIMA to assist developers in the development of compliant systems. All XYZ users are responsible for maintaining the XYZ package as well as their product applications. Recommend XYZ users make necessary corrections to display all 8-bit color images that contain LUTs that are less than or equal to 256 bytes.

_____
TEST DIRECTOR

_____
CORRECTIVE ACTION:

CLOSED: _____ _____
TEST DIRECTOR DATE

Figure 7. Example of Test Incident Report

II-2.5 Analysis and Discussion. The test team will examine the test data to determine to what extent the sample implementation is compliant with the IAS specification. As an implementation anomaly is discovered, it will be documented. The anomaly will be analyzed against the applicable criteria and an assessment on the overall impact will be included. Criteria used for validation testing, candidate test cases/scenarios, and text in the specification are suspect and subject to change. The testers will work with the developer to reach a recommended resolution. The resulting recommendations will be widely disseminated for comments and review to ensure that the interested community is mutually

satisfied. The resulting criteria and test cases will become the measures by which future implementations will be evaluated for conformance to the new standard.

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APPENDIX A

ACRONYMS

ACRONYM	DEFINITION
ADL	Alexandria Digital Library
BQS	Boolean Query Syntax
C2	Command and Control
CAF	Catalog Access Facility
CFS	Center for Standards
CIIF	Common Imagery Interoperability Facility
CIIP	Common Imagery Interoperability Profile
CIIWG	Common Imagery Interoperability Working Group
CIO	Central Imagery Office
CTE	Certification Test and Evaluation
DISA	Defense Information Systems Agency
DMA	Defense Mapping Agency
DOD	Department of Defense
FDDI	Fiber Distributed Data Interface
IAF	Image Access Facility
IAS	Image Access Service
IDEX	Image Data Exploitation System
IDL	Interface Definition Language
IIOP	Internet Interoperability Protocol
ISMC	Imagery Standards Management Committee
IVTP	IAS Specification Validation Test Profile
JIEO	Joint Interoperability and Engineering Organization
JITC	Joint Interoperability Test Command
LMC	Lockheed Martin Federal Systems
MIL-HDBK	Military Handbook
MIL-STD	Military Standard
MOT	Means of Testing
NIMA	National Imagery and Mapping Agency
NITF	National Imagery Transmission Format

NITFS	National Imagery Transmission Format Standard
NTB	NITFS Technical Board
P&NF	Profile and Notification Facility
RRDS	Reduced Resolution Data Set
TFRD	Tape Format Requirements Document
TIR	Test Incident Report
UCSB	University of California, Santa Barbara
USIGS	United States Imagery and Geospatial System
WGS84	World Geodetic System 1984

APPENDIX B

REFERENCES

B-1 NIMA DOCUMENTS

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B-2 JIEO DOCUMENTS

a. JIEO Circular 9008, National Imagery Transmission Format Standard (NITFS) Certification Test & Evaluation Program Plan, 30 June 1993, with errata sheet dated 28 June 1996.